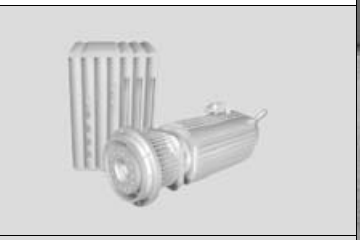
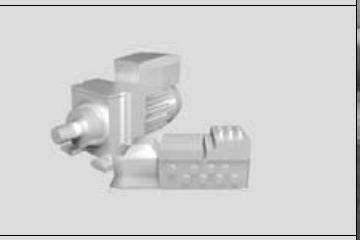
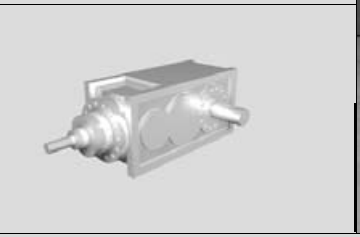
SEW EURODRIVE







DOP11A Operator Terminals

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Operating Instructions

SEW EURODRIVE

1 Important Notes 4

2 Safety Notes 6

3 Unit Information, Installation and Hardware 8
3.1 Introduction 8
3.2 Unit designation, rating plates and scope of supply 13
3.3 Unit design DOP11A-10 14
3.4 Unit design DOP11A-20 15
3.5 Unit design DOP11A-30 16
3.6 Unit design DOP11A-40 17
3.7 Unit design DOP11A-50 18
3.8 Accessories and options 19

4 Installation 21
4.1 Installation instructions for basic unit 21
4.2 UL compliant installation 22
4.3 Connection basic unit DOP11A-10 to DOP11A-50 22
4.4 Connection to a PC 23
4.5 Connection RS-485 (DOP11A-10 and DOP11A-30 only) 24
4.6 Connection RS-422 via UWS11A 27
4.7 Connection PFE11A Ethernet option 28
4.8 Connection PFP11A Profibus DP option 29
4.9 Connection to a Siemens S7 via MPI and PCM11A 30

5 Startup 31
5.1 Initial operation 31
5.2 Operator terminal functions 34

6 Operation and Service 43
6.1 Project transfer with PC and HMI-Builder 43
6.2 Creating a project 47
6.3 Operating display at unit start 54
6.4 Error messages 55
6.5 SEW Electronics Service 57

7 Technical Data and Dimension Drawings 58
7.1 General technical data 58
7.2 Pin assignment 61
7.3 DOP11A-10 64
7.4 DOP11A-20 65
7.5 DOP11A-30 66
7.6 DOP11A-40 67
7.7 DOP11A-50 68

8 Appendix 69
8.1 Membrane keypad 69

1 Important Notes

Safety and warning instructions

Always observe the safety and warning instructions contained in this publication!

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

You must adhere to the operating instructions to ensure:

- Trouble-free operation
- Fulfillment of any rights to claim under limited warranty

Consequently, read the operating instructions before you start working with the unit!

The operating instructions contain important information about servicing. Therefore, keep the operating instructions close to the unit.

Notes on terminology

The operator terminals of the DOP11A series (Drive Operator Panel) can communicate with SEW frequency inverters and selected programmable logic controllers (PLC) via different communication paths at the same time.

For simplicity sake, we will be referring to **both units (PLC and inverter)** as **controller** in this document.

Designated use

The operator terminals of the DOP11A series are units for operation and diagnostics of industrial and commercial systems.

Do not start up the unit (take it into operation in the designated fashion) until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 89/392/EEC (with reference to EN 60204).

Application environment

The following uses are forbidden unless measures are expressly taken to make them possible:

- Use in explosion-proof areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. You will find a list of the approved materials in the appendix.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178.

Safety functions

The operator terminals of the DOP11A series may not execute any safety functions without master safety systems.

Use higher level safety systems to guarantee the protection of machinery and people.

Disassembly and waste disposal

- Complete or partial recycling of the operator terminal is subject to local regulations.
- Note that the following components contain substances that may represent a health hazard and cause environmental pollution: Lithium battery, electrolyte condensers and display.

2 Safety Notes

General information

- Read the safety precautions carefully.
- Check the delivery for transport damage. If damage is found, advise your supplier.
- The terminal fulfills the requirements of article 4 of EMC directive 89/336/EEC.
- Do not use the terminal in an environment with high explosive hazard.
- SEW-EURODRIVE is not liable for modifications, changes, additions and / or alterations to the product.
- Use only spare parts and accessories manufactured according to SEW-EURODRIVE specifications.
- Read the installation and operating instructions completely and carefully prior to installation, use or repair of the terminal.
- Never allow fluids to penetrate the slots or holes in the terminal. This may lead to a fire or cause the equipment to become live.
- Operation of the terminal is restricted to qualified personnel.

Installation and startup

- The terminal has been designed for stationary installation.
- Place the terminal on a stable base during installation. The terminal may be damaged if it is dropped.
- Install the terminal according to the accompanying installation instructions.
- The unit must be grounded according to the accompanying installation instructions.
- The installation must be performed by qualified personnel.
- Route high-voltage cables, signal cables and supply cables separately from one another.
- Make sure that the voltage and polarity of the electrical power source are correct before you connect the terminal to the power supply.
- The openings in the housing are designed to allow air to circulate and must not be covered over.
- Do not install the terminal in locations where it will be exposed to a powerful magnetic field.
- **Do not install or operate the terminal where it will be exposed to direct sunlight.**
- The peripheral equipment must be suitable for the application.
- On certain terminal models, the display glass is covered with a laminated foil to protect it from scratches. Pull off the foil carefully following installation to prevent static electricity causing damage to the terminal.

- Make sure that **preventive measures** and **protection devices** correspond to the **applicable regulations (e.g. EN 60204 or EN 50178).**

  Required preventive measures: Grounding the unit

  Required protection device: Overcurrent protection devices

Operating notes

- Always keep the terminal clean.
- **Emergency stop and other safety functions should not be controlled from the terminal.**
- Do not touch the keys, displays, etc. with sharp objects.
- Bear in mind that the terminal is ready to operate even if the backlighting no longer functions. This means keypad and touchscreen inputs will still be registered.

Service and maintenance

- The agreed limited warranty applies.
- Clean the display and face of the terminal with a soft cloth and mild detergent.
- Repairs must be performed by qualified personnel.

3 Unit Information, Installation and Hardware

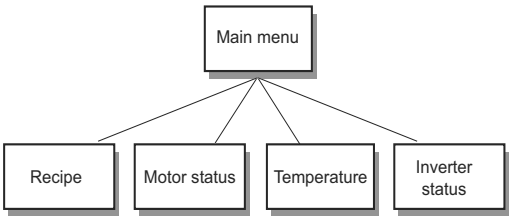
3.1 Introduction

Production rates in modern industrial environments are steadily increasing and operator tasks at machines or on production lines are becoming increasingly more complex and involve more responsibility. The operator must be able to obtain information on current status easily and quickly, and be able to influence the operation of the machine just as easily. The functions in the control systems are also increasing and becoming more advanced, enabling more complicated processes to be controlled efficiently. The **operator terminals** make **human-machine communication** simple and safe even for the most advanced processes.

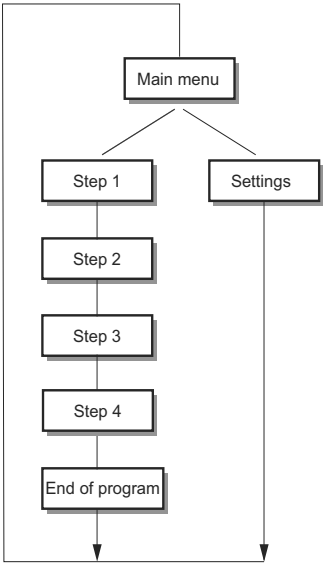
The graphical operator terminals have been developed to meet the requirements set for human-machine communication when controlling or monitoring different applications in the manufacturing and process industries, etc. They simplify the operators work since they can easily be adapted to the working environment, That means the operator can continue to use the concepts her or she is familiar with.

Projects in the terminal can be built up as **menu hierarchies** or as **sequences**. A menu hierarchy consists of a main menu (with, for example, an overview) and a number of underlying images with more detailed information on special sections. The operator normally selects which image is to be shown.

The images in the operator terminals are called **blocks**.



A sequence is also based on a main menu, from which the operator selects a sequence showing the blocks in a predetermined order. Control of block display usually takes place via the program in the controller.



The functions of the operator terminals make for a graphical or text-based display of the process. There are also functions for **alarm handling, printouts, trends, recipe handling, time control,** etc.

The functions are not only easy to use in the panel, they are also cost-efficient in comparison with conventional solutions with buttons, indicator lamps, time relays, preset counters and seven-day clocks. There are also functions to increase the application of the drive electronics.

Programming

You program the operator terminal via PC and the HMI-Builder software.

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The operator terminal is to a large extent object-oriented, i.e. first an object is selected and then the function the object is to have. All types of signals are defined on this principle.

The programmed project is stored in the operator terminal.

Connection of the terminal to the SEW frequency inverter

There are many advantages in using a terminal together with the controller system:

- The user does not need to make any changes or additions in the existing controller programs
- and the terminal does not block any of the inputs or outputs in the controller system.
- Overview of controller functions will be optimized
  - e.g. time control and alarm management

Status display and control

The operator is familiar with indicator lamps as well as analog and digital display instruments since these are used in the majority of applications today. The same applies to push buttons and rotary and thumbwheel switches for controlling a system. The terminal enables the operator to have all status displays and controls in one unit.

The operator can easily see and influence information in the controller system. Moreover, it is possible to clearly see and influence all the signals affecting a specific object, e.g. a pump or a drive unit, which further simplifies the work.

This is possible thanks to the fact that the interchange of all information takes place through the so-called blocks in the terminal. Blocks can be of the text block type, with only text information, or of the graphic block type, with full graphical presentation.

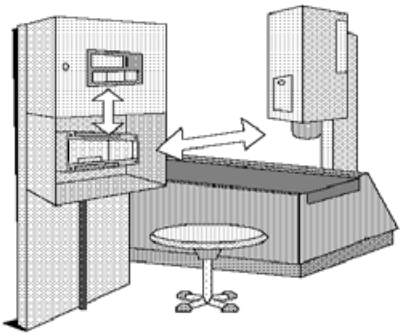
The operator terminals are equipped with function keys for direct control. Maneuvering is controlled by linking different commands to the function keys. This optimizes the maneuvering process.

If several blocks are used, the operator can jump between the different blocks by using jump objects. This creates a menu hierarchy, which produces a structured application.

Setting up the operator terminal

The terminal should be placed at the workplace to ensure maximum usability. This will enable the operator to receive all necessary information and work effectively. Set up the terminal at the correct height so that the user can see and operate it without problems. Visibility of the screen is influenced by distance, height, angle, light and color selection.

Monitoring, control and maintenance are remote functions and can be executed from a different location in the building or a different city. Communication in such instances can take place via LAN (Local Area Network), Internet or modem. If there is a long production line with a large number of workplaces it is possible to connect several terminals to one or several controller systems in the network.



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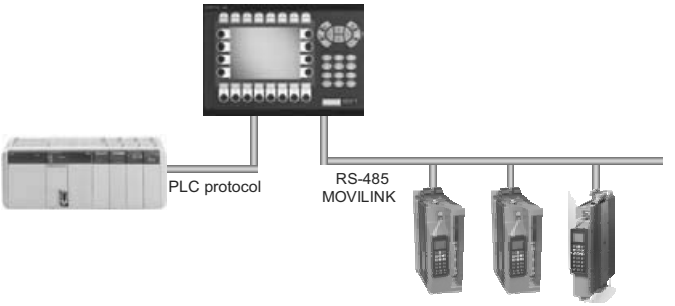
Compact solutions

External units such as barcode scanners, weighing machines, modems, etc. can be connected through the terminal to the controller system. All that is required is for the unit to be connected to an RS-232 interface, and that communication is made through ASCII protocol. Data entering the terminal is written directly to the controller register.

It is also possible to connect a unit working in parallel, such as an additional terminal or a PC with the MOVITOOLS® programming tool for the inverter. The terminal then makes it possible to program the controller system while also communicating with the controller system.

When the PLC and the inverter are connected to one terminal (two drivers in the terminal), data can be exchanged between the two units (analog and digital signals).



3.2 Unit designation, rating plates and scope of supply

Example unit designation

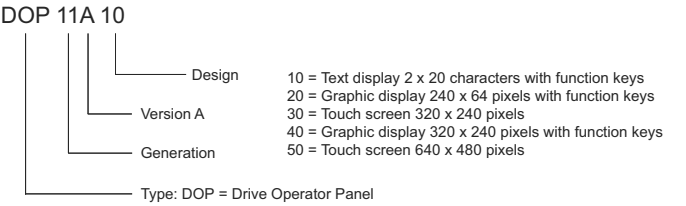

DOP 11A 10
Design
Version A
Generation
Type: DOP = Drive Operator Panel
10 = Text display 2 x 20 characters with function keys
20 = Graphic display 240 x 64 pixels with function keys
30 = Touch screen 320 x 240 pixels
40 = Graphic display 320 x 240 pixels with function keys
50 = Touch screen 640 x 480 pixels
53648AEN

Figure 1: Unit designation

Sample nameplate

The unit nameplate is attached to the side of the unit.

Figure 2: Unit nameplate

Scope of delivery

The scope of delivery includes:

- DOP11A operator terminal
- Installation material and installation template
- Operating instructions with assembly and installation notes
- DC 24 V plug connector Phönix COMBICON 5mm 3-pole (except DOP11A-50)

3.3 Unit design DOP11A-10

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Figure 3: DOP11A-10

[1] Display
[2] Function keys
[3] Navigation keys
[4] Numerical keys

- 2 x 20 character LCD text display (monochrome) with background illumination
- DC 24 V voltage supply, 200 mA
- Three serial interfaces (RS-232 & RS-422/RS-485); two can be used simultaneously
- IP65 membrane keypad with navigation keys, numeric keypad and three function keys
- 64 Kbytes Flash EEPROM
- Outer dimensions 142 x 90 x 46.5 mm

3.4 Unit design DOP11A-20

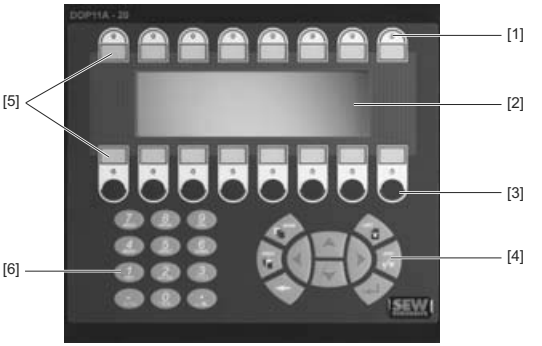

Figure 4: DOP11A-20

[1] LEDs red / green
[2] Display
[3] Function keys
[4] Navigation keys
[5] Labeling tiles
[6] Numerical keys

- 240 x 64 pixel LCD graphic display (monochrome) with background illumination
- DC 24 V voltage supply, 450 mA
- Two serial interfaces (RS-232 & RS-422); two can be used simultaneously
- IP65 membrane keypad with navigation keys, numeric keypad and three function keys
- 16 LEDs (two colors red / green)
- 1 option slot
- 400 Kbytes Flash EEPROM
- Outer dimensions 214 x 194 x 75 mm

3.5 Unit design DOP11A-30

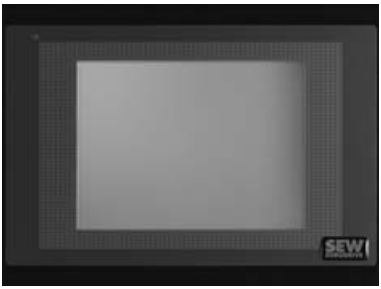

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Figure 5: DOP11A-30

- 320 x 240 pixels, ¼ VGA touch display (256 colors, STN, 5.7") with background illumination
- DC 24 V voltage supply, 450 mA
- Three serial interfaces (RS-232, RS-422 and RS-485); two can be used simultaneously
- IP65
- Horizontal or vertical installation
- 1 option slot
- 400 Kbytes Flash EEPROM
- Outer dimensions 200 x 150 x 74 mm

3.6 Unit design DOP11A-40

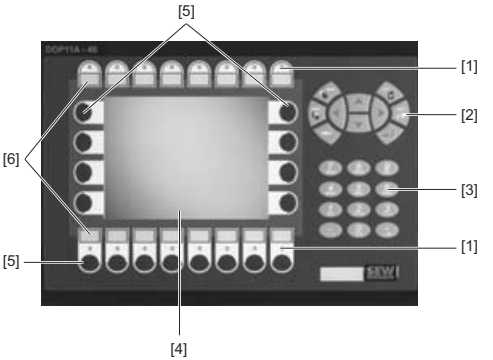

Figure 6: DOP11A-40

[1] LEDs red / green
[2] Navigation keys
[3] Numerical keys
[4] Display
[5] Function keys
[6] Labeling tiles

- 320 x 240 pixels, ¼ VGA graphic display (256 colors, STN, 5.7") with background illumination
- DC 24 V, 550 mA
- Two serial interfaces (RS-232 & RS-422); two can be used simultaneously
- IP65 membrane keypad with navigation keys, numeric keypad and 16 function keys
- 16 LEDs (two colors red / green)
- 2 expansion slots
- 400 Kbytes Flash EEPROM
- Outer dimensions 276 x 194 x 92.3 mm

3.7 Unit design DOP11A-50

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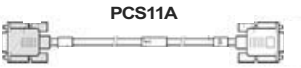
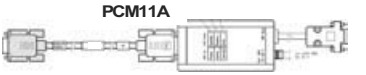
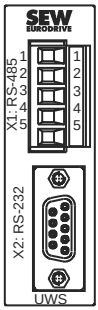
Figure 7: DOP11A-50

- 640 x 480 pixels, VGA Touch Screen (256 colors, 10.4") with background illumination
- AC 100 - 240 V, 350 mA
- Two serial interfaces (RS-232 & RS-422); two can be used simultaneously
- IP65
- 2 expansion slots
- 1600 Kbytes Flash EEPROM
- 290 x 247 x 114 mm

3.8 Accessories and options

Cables for programming of the DOP11A operator terminal and communication between operator terminal and MOVIDRIVE®.

PCS11A (Panel Cable Serial)	Connection cable between operator terminal (RS-232) and PC (RS-232) for programming of the operator terminal. Set length of 3 m (10ft.). 		8248087
PCM11A (Panel Cable MPI)	Communication cable between operator terminals (RS-232) and SIMATIC S7 via MPI. Set length of 3 m (10ft.). 		8248303
PCC11A (Panel Cable Converter)	Communication cable between operator terminal (RS-422) and UWS11A or USS21A (RS-232) interface converters. For communication with SEW frequency inverter. Set length of 3 m (10ft.). 		8248095
PFE11A (Panel Fieldbus Ethernet)	Option card Ethernet TCP/IP For connection of the DOP11A operator terminal to the customer's PC network. The following functions become available by using the Ethernet option: • Operation of the HMI-Builder software for programming of the operator terminal via Ethernet (fast upload and download of projects). • Using the integrated WEB server for operation and control of the operator terminal via Internet Explorer. • For operation of MOVITOOLS® via Ethernet and using the Passthrough function. Additional software is required for rerouting the PC communication port (Com1 to Com9) to the Ethernet IP-address of the operator terminal.		8248079

PFP11A (Panel Fieldbus PROFIBUS)	PROFIBUS DP interface For connection of the DOP11A operator terminal to the customer's PROFIBUS fieldbus. The operator terminal serves as a slave in PROFIBUS and is linked to the PLC process image with up to 128 data words. PLC independent option for data exchange between control and operator terminal. You can communicate at the same time to the drive components via the serial interface.	PROFIBUS DP option card 	8248060
UWS11A	Interface converter for DIN rail mounting RS-232 ↔ RS-485 		822689X

4 Installation

4.1 Installation instructions for basic unit

It is essential to comply with the safety instructions during installation!

Separate cable ducts

Route **power cables** and **electronics cables** in **separate cable ducts**.

Cross sections

- Voltage supply: **Cross section according to rated input current**.
- Electronics cables:
  - One core per terminal 0.20 ... 0.75 mm^2 (AWG 20 ... 17)
  - Two cores per terminal 0.20 ... 0.75 mm^2 (AWG 20 ... 17)

Shielding and grounding

- Use **shielded control cables** only.
- Connect the **shield by the shortest possible route and make sure it is grounded over a wide area at both ends**. You can ground one end of the shield via a suppression capacitor (220 nF / 50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the controller end and the inner shield on the other end.

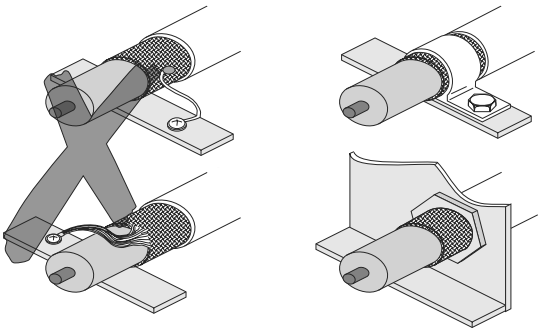


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Figure 8: Example of correct shield connection with metal clamp (shield clamp) or metal cable gland

- **Shielding** can also be achieved by laying the cables in **grounded sheet metal ducts or metal pipes**. In this case, the **power cables and control cables** should be **routed separately**.
- The unit is grounded via the connector for 24 V / 240 V voltage supply.

4.2 UL compliant installation

Please note the following points for UL compliant installation:

Use only copper conductors with a temperature range of 60 / 75 °C as connection cables.

Electrical connection according to the methods described in class 1, paragraph 2 (article 501-4(b) according to National Electric Code NFPA70).

Use only tested units with a **limited output voltage** (V_{max} = DC 30 V) and **limited output current** (I ≤ 8 A) as an **external DC 24 V voltage source**.

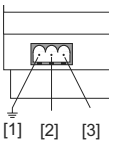
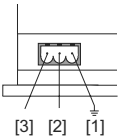
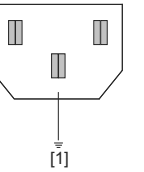
UL certification does not apply to operation in voltage supply systems with a non-grounded star point (IT systems).

4.3 Connection basic unit DOP11A-10 to DOP11A-50

Voltage supply

Ensure correct polarity when connecting the terminal. Incorrect polarity will damage the unit.

Make sure that the operator terminal and the controller system have the same electrical grounding (reference voltage value). Communication errors may occur if this is not the case.

DOP 11A-10, DOP11A-20 & DOP11A-40 / DOP 11A-30	DOP 11A-50
 	
Voltage supply DOP11A-10 to DOP11A-40	Voltage supply DOP11A-50 (AC 100 - 240 V)
53031AXX	53630AXX

[1] Ground
[2] 0 V
[3] +24 V

4.4 Connection to a PC

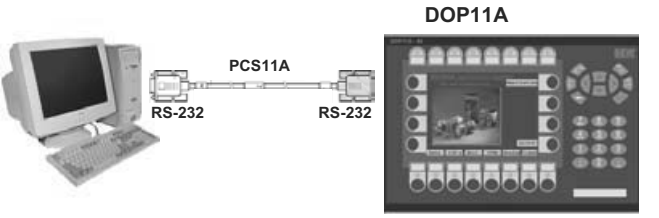


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Figure 9: Connection to a PC

Programming of the operator terminal takes place via the HMI-Builder software.

You need the PCS11A communication cable to program the operator terminal.

The power must be switched off when connecting the units.

4.5 Connection RS-485 (DOP11A-10 and DOP11A-30 only)

You can connect up to 31 MOVIDRIVE® units to one operator terminal with the RS-485 interface.

Connection of the DOP11A to a MOVIDRIVE® frequency inverter directly via RS-485:

- DOP11A-10 via SubD 25 plug
- DOP11A-30 via Phoenix plug-in terminal strip

Wiring diagram RS-485 interface

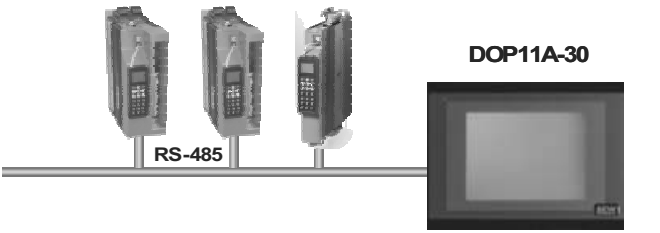

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Figure 10: RS-485 connection

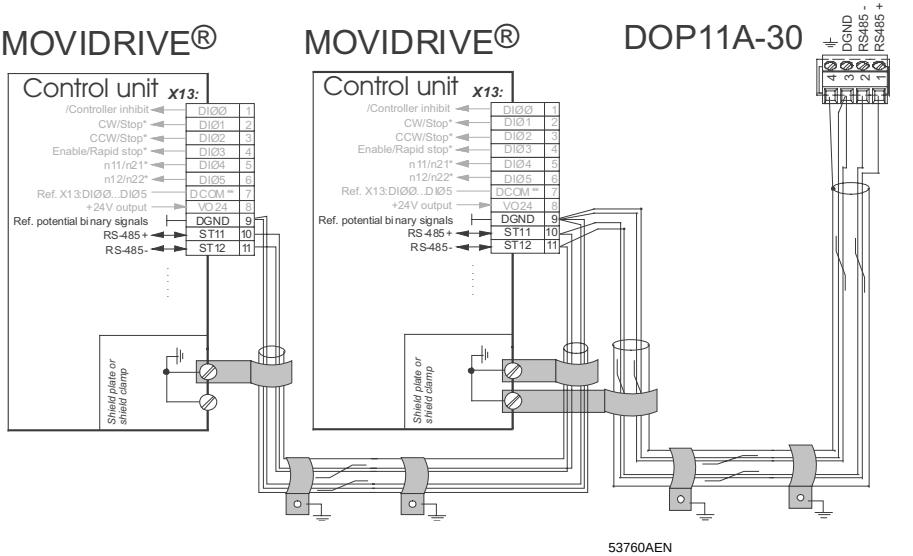

Figure 11: Pin assignment DOP11A-30

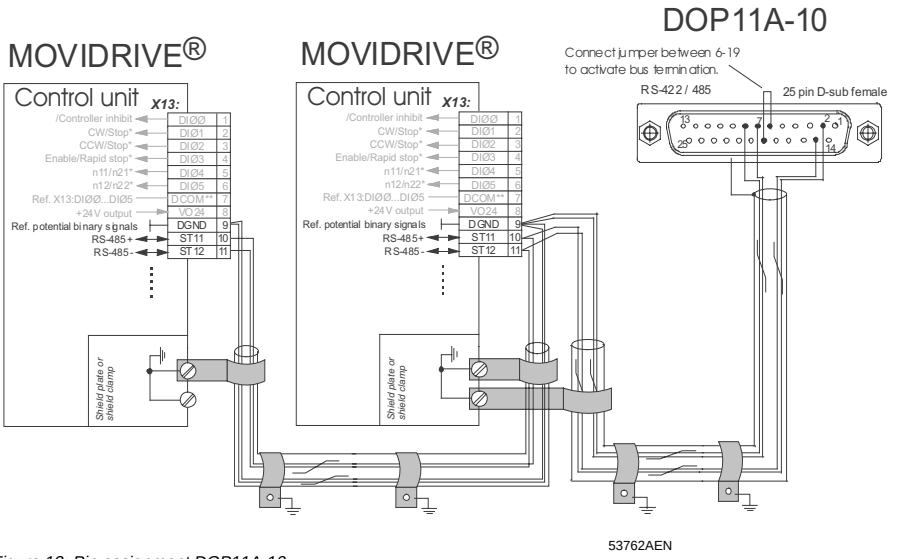

Figure 12: Pin assignment DOP11A-10

Cable specification

- Use a 2x2 core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Conductor cross section 0.5 ... 0.75 mm^2 (AWG 20 ... 18)
  - Cable resistance 100 ... 150 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz

  The following cable is suitable, for example:
  - Lappkabel, UNITRONIC® BUS CAN, 2 x 2 x 0.5mm^2.

Shielding

- Apply shield on both ends over large area at the controller electronics shield clamp and in the housing of the Sub-D 25 connector of the operator terminal. Do not connect the shield ends with DGND!

Line length

- The permitted total cable length is 200 m (660 ft).

Terminating resistor

- The controller and the UWS11A interface converter come equipped with dynamic terminating resistors. Do not connect **any external terminating resistors** in this instance!
- If the DOP11A-10 operator terminal is connected with the frequency inverters via RS-485, you will have to activate the terminating resistor in the Sub-D25 connector of the DOP11A-10 (jumper between pin 6 and pin 19) in case the operator terminal is the first or last station.

There must not be any difference of potential between the units connected using the RS-485. Take suitable measures to avoid a potential displacement, e.g. by connecting the unit ground connectors using a separate lead.

4.6 Connection RS-422 via UWS11A

Connecting the DOP11A to a MOVIDRIVE® frequency inverter via UWS11A.

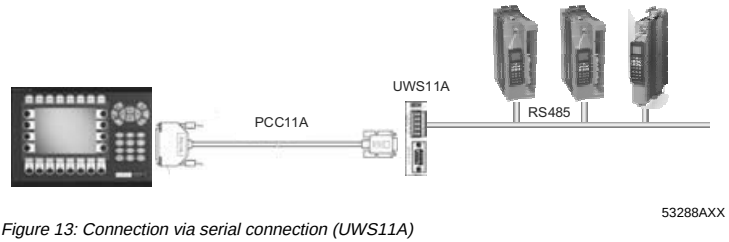

Figure 13: Connection via serial connection (UWS11A)

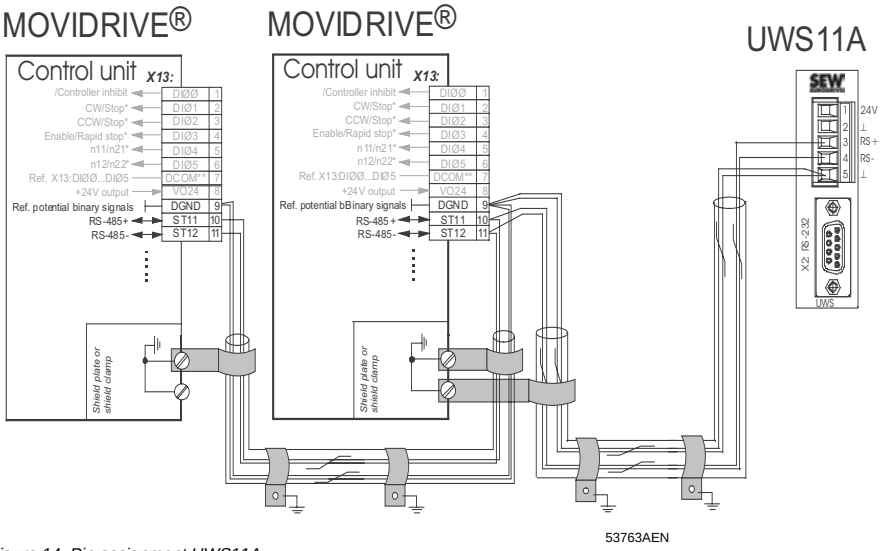

Figure 14: Pin assignment UWS11A

RS-485 connection Cable specification see section 4.5.

4.7 Connection PFE11A Ethernet option

Connection of DOP11A with PFE11A Ethernet option card (not available with DOP11A-10) to a PC for programming and remote maintenance via Ethernet and TCP/IP.

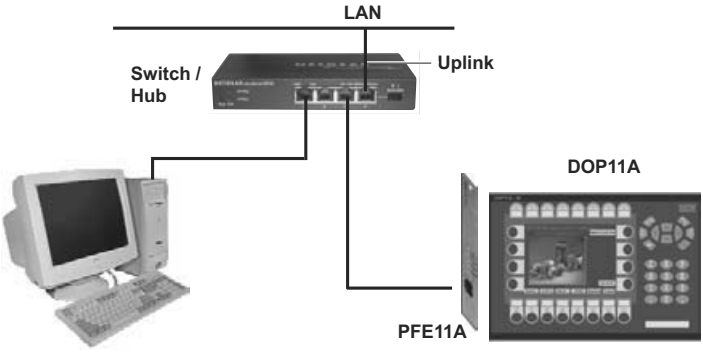

Figure 15: Connection PFE 11A Ethernet option

There are four LEDs on the front of the PFE11A expansion card.

These LEDs have the following functions:

SEL	YELLOW	This LED will light up if there is a contact between terminal processor and expansion card connection.
TxD	YELLOW	This LED lights up when you send Ethernet data.
RxD	YELLOW	This LED lights up when you receive Ethernet data.
LINK	GREEN	This LED lights up in case the Ethernet cable (twisted pair cable) has been connected correctly.

Cable specification

Use a shielded standard Ethernet cable with shielded RJ45 connectors and cables according to specification CAT5. The maximum cable length is not to exceed 100 m (300ft.).

The following cable is suitable, for example:

– Lappkabel, UNITRONIC® LAN UTP BS flexible 4x2x26AWG

You will find detailed information in the DOP11A operator terminal system manual.

You will find a description for determination of the Ethernet (MAC) address of the option card in section 5.2, in the paragraph Configuration mode (SETUP).

4.8 Connection PFP11A Profibus DP option

Data exchange of a PLC with a DOP11A via PFP11A and PROFIBUS DP. (See section 3.8, Accessories and options, for a description of the PFP11A.)

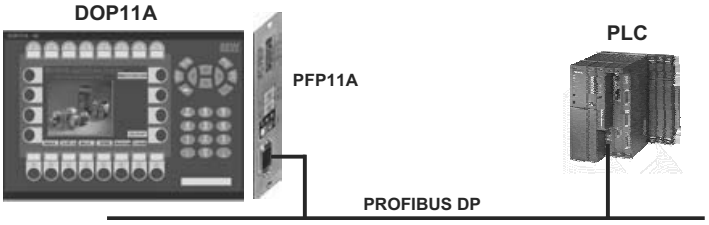

Figure 16: Connection PFP11A PROFIBUS option

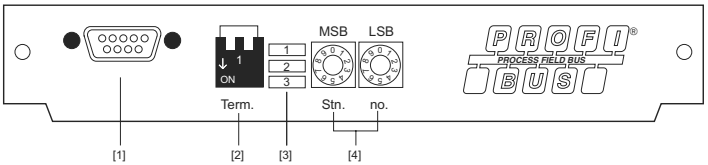

Figure 17: Connection PFP11A PROFIBUS option

[1] 9-pin sub D socket

[2] **PROFIBUS terminating resistor**
If the panel is located at the beginning or end of a PROFIBUS segment and if only one PROFIBUS cable is connected to the panel, you will either have to activate the connector in the terminating resistor (if present) or set the switch on the PFP11A card to **On**.
Never activate both terminating resistors in the connector and card at the same time!

[3] The LEDs on the expansion card have the following functions:

1:ERR	Red	Displays configuration or communication errors. The LED lights up red until the unit is configured and indicates a time violation.
2:PWR	Green	Displays a voltage supply with DC 5 V.
3:DIA	Green	Displays a diagnostics error in the PROFIBUS network. Is not used by the panel.

[4] The PROFIBUS station address is set using two rotary switches.

The GSD type files required for configuration of the PROFIBUS are available on the HMI-Builder software ROM or at www.sew-eurodrive.de in the Software tab.

Cable specification

Use a two-core, twisted and shielded copper cable to PROFIBUS specification for conductor type A to EN 50170 (V2).

The following cable is suitable, for example:

– Lappkabel, UNITRONIC® BUS L2/F.I.P.

You will find detailed information in the DOP11A operator terminal system manual.

4.9 Connection to a Siemens S7 via MPI and PCM11A

Data exchange of a Siemens S7 via PCM11A and MPI.

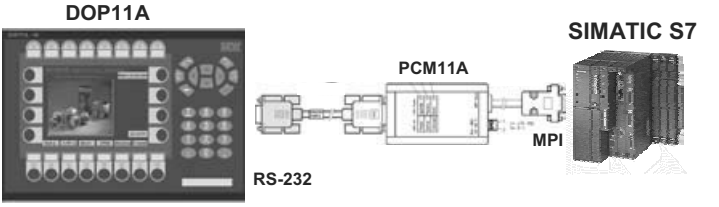

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Figure 18: Connection to a Siemens S7 via MPI and PCM11A

You will find detailed information in the DOP11A operator terminal system manual.

5 Startup

5.1 Initial operation

It is essential to comply with the safety notes during startup!

General startup instructions

Requirement

Requirement for a successful startup is the correct electrical connection of the operator terminal.

The functions described in this section will enable users to upload a project to the operator terminal and establish the unit in the necessary communication pathways. You will find more information on creating new projects in the DOP operator terminal system manual.

Do not use the DOP11A operator terminals as safety devices for industrial applications. Use monitoring systems or mechanical protection devices as safety features to avoid possible damage to property or injury to people.

Preliminary work and resources

- Check the installation.
- Prevent unintentional start of motor via connected frequency inverter by suitable measures.
  - Removing the electronics input X13.0/controller inhibit in MOVIDRIVE® or
  - clearing the supply voltage (24 V back-up voltage still has to be present)
  - Removing terminals "CW operation" and "Enable" in MOVITRAC® 07

  Furthermore, additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.
- Connect operator terminal with corresponding cable to MOVIDRIVE® or MOVITRAC® 07.

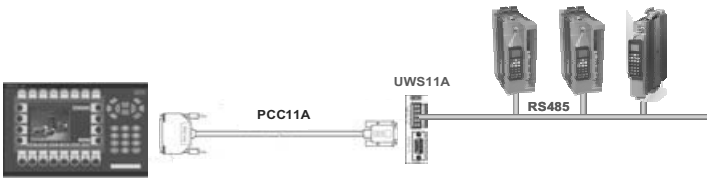

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Figure 19: Connection between operator terminal and MOVIDRIVE® MDX60B/61B

- Connect operator terminal with the PC via PCS11A (RS-232) programming cable. Operator terminal and PC must be de-energized when you do this, otherwise undefined states may be adopted. Turn on PC and start HMI-Builder configuration software; install software if not present yet.

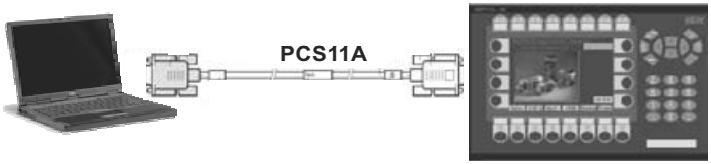

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Figure 20: Connection between PC and operator terminal

- Start 24 V supply for operator terminal and connected frequency inverters.

Units are delivered without loaded project.

Units with membrane keyboard (DOP11A-10, DOP11A-20 and DOP11A-40) will report the following information when they are initially taken into operation:

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Figure 21: Initial image DOP11A-10 in delivery state

Units with membrane keyboard DOP11A-10, DOP11A-20 and DOP11A-40 will remain in "Edit/Transfer " mode. You will find a description of the individual functions in the following section.

The touchscreen units DOP11A-30 and DOP11A-50 report that no inverter or PLC communication driver have been loaded.

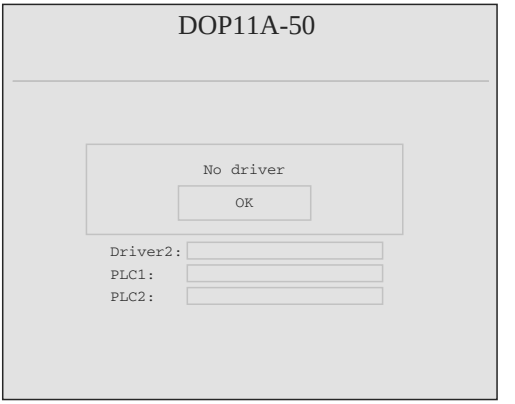

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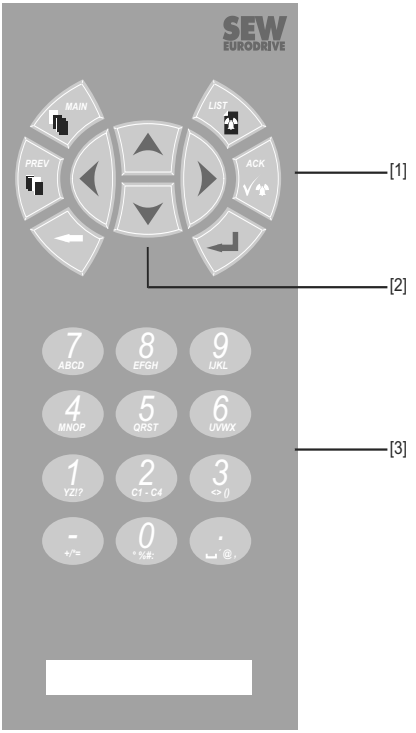
Figure 22: Initial image DOP11A-50 in delivery state

5.2 Operator terminal functions

This chapter describes the different modes in the operator terminal, the keyboard and the information page in the terminal.

Terminal keyboard



[1] Integrated function keys (not DOP11A-10)
[2] Arrow keys
[3] Alphanumeric keys

Alphanumeric keys

From the alphanumeric keyboard the following characters can be entered in dynamic text and numerical objects during run mode in the terminal.

0-9

A-Z

a-z

! ? < > ( ) + / * = º % # : ' @

National characters

You cannot enter characters via the keyboard of the DOP11A-10 terminal because it is not equipped with alphanumeric keys.

Numeric values are entered by pressing the respective key once.

Enter capital letters (A to Z) by pressing the respective key two to five times.

Enter lower case letters (a to z) by pressing the respective key six to nine times.

The delay time interval between pressing can be set. If the key is not pressed within the delay time interval the cursor moves to the next position.

Enter national characters by pressing key 2 (C1C4) two to nine times. This option offers characters that are not included in the standard character set of the alphanumeric terminal keyboard.

You can use all characters of the selected character set in the HMI-Builder except those characters reserved for static text. Enter the required character by pressing the ALT+0 key combination on the numeric keyboard of the PC; then enter the character code. You select the used character set in the HMI-Builder. See DOP11A operator terminal system manual.

Reserved characters

The ASCII characters 0 32 (Hex 0-1F) and 127 are reserved for internal terminal functions and must not be used in projects or files in the terminal. The characters are used as control characters.

Arrow keys

Use the arrow keys to move the cursor in a menu or dialog.

Integrated function keys

Not all the keys are available on all terminals.

Use the [ENTER] key to confirm the setting made and to go to the next line or level.

Use the [PREV] key to return to the previous block.

Use the [LIST] key to open the alarm list.

Use the [ACK] key to acknowledge an alarm in the alarm list.

Use the [MAIN] key to jump to block 0 in run mode.

Use the [←] key to delete characters to the left of the cursor.

When the main block (block number 0) was displayed, the [PREV] key will not work because the block history is deleted once the main block has been reached.

Key combinations

The terminal has key sequences for the following functions.

Key sequence	Function
[←] [MAIN]	Toggle between SETUP and RUN.
[←] [F1]	Hold this key combination pressed during startup to activate the mode for downloading the system program (see section 4, Installation).
[←] [PREV]	Open information window.
◀ + ▶	Hold the key sequence pressed during start up to activate the self-test function.

Terminal type	Function			
	Sysload	Self-test	Toggle between SETUP and RUN	Diagnostics window
DOP11A-10	[←] + [F1]	◀ + ▶	[←] + [ENTER]	[←] + ▶
DOP11A-20	[←] + [F1]	◀ + ▶	[←] + [MAIN]	[←] + [PREV]
DOP11A-40	[←] + [F1]	◀ + ▶	[←] + [MAIN]	[←] + [PREV]

Switches on DOP11A-30 and DOP11A-50 terminals

Interrupt power supply to terminal to call up individual modes for DOP11A-30 and DOP11A-50.

Turn the rotary switch on the side or back of the terminal to the position shown in the following table. You can now turn on the power supply once again.

Switch position	Function
0	Run mode (RUN, standard operation)
1	Sysload
2	Calibrate touch
3	Cursor
4	Configuration mode (SETUP)
5	Transfer mode, TRANSFER
8	Activates self-test function
9	Erases the clock memory

RUN and SETUP operating modes

The terminal has two operating modes.

- **Configuration mode (SETUP):** All basic settings are made in this mode, such as selection of controller system and menu language.
- **Run-time mode (RUN):** This mode is for running the application.

Transfer

Here you manually set the terminal to transfer mode. When the terminal is in transfer mode it is possible to transfer projects between the terminal and the programming software. By using the automatic panel switching function RUN / TRANSFER in the programming software, the software automatically sets the terminal to transfer mode.

Switching between modes

Switch between RUN and SETUP

Press [←] and [MAIN] simultaneously to enter configuration mode (SETUP). You can now press any key when the start-up menu is shown to enter the configuration mode, SETUP. To return to run mode, press [←] and [MAIN].

In DOP11A-30 and DOP11A-50 you set the switch on the side/back of the terminal in position 4 to access the configuration mode (Setup). The switch should be in position 0 for standard operation.

Configuration mode (SETUP)

This section contains a description of those functions that cannot be carried out with the HMI-Builder. You will find more information on possible settings in the HMI-Builder in the DOP11A operator terminal system manual.

Erasing the memory

The setup menu of the terminal includes the **Erase memory** function. Use this function to erase the application memory of the terminal. All blocks and definitions for alarms, time channels, function keys and system signals will be erased.

Parameter	Description
Enter	Memory is erased. The configuration menu is shown automatically when the erasure is completed.
Prev	Return to previous level without erasing the memory.

When the memory is erased all data stored in the terminal will be lost. The language selection parameter is not affected by this function. All other parameters will be erased or given their default values.

Contrast setting

DOP11A-10:

Contrast is set with a rotary regulator on the back of the terminal.

DOP11A-20, DOP11A-30 and DOP11A-40:

Contrast setting takes place in operating mode by jumping to system block 997. The monitor will be brighter by pressing the + function key. You reduce brightness by pressing the - function key. Return to the previous level by pressing **EXIT**.

DOP11A-50:

The color intensity of the display can be controlled through a data register and the **DIM** command, specified in the command line under **Setup / System signals** of the programming software.

The contrast depends on the ambient temperature. If the terminal is programmed at a room temperature far below the one at the installation site, you will have to adjust the contrast at the actual ambient temperature after 15 - 30 minutes.

Determining the Ethernet (MAC) address:

The Ethernet address of the PFE11A option card is displayed in configuration mode (SETUP). Use the key combination [←] [MAIN] (DOP11A-20 and DOP11A-40) or switch position 4 (DOP11A-30 and DOP11A-50) to enter configuration mode.

The physical Ethernet address is displayed in the menu item **Expansion Cards - Slot 1 - PFE**.

Run mode (RUN)

The application is executed in run mode. Block 0 will automatically be shown on the display when changing to run mode.

The built-in keyboard in the terminal is used to highlight and change values in run mode.

If a communication error occurs between the terminal and the controller system, an error message will be shown on the display. The terminal starts automatically once the communication is resumed. If you press an I/O key combination while a communication error is present, the combination will be stored in the terminal buffer and transferred to the controller system once communication resumes.

The terminal clock can continuously send data to a register in the controller to activate a monitoring function. The controller can use this monitoring function to detect a possible communication error. The controller system checks if the register is updated, and if not an alarm indicating a communication error is activated in the controller system.

The functional principle of individual objects and functions in operating mode will be explained in connection with the description of the respective objects and functions.

Setting the real-time clock

The real-time clock of the terminal is set in the **Setup** menu under **Date / Time.**.

Select the option **Set terminal clock**. The date and time will now be displayed. Press [SET] to change the setting. Enter the required date and time. Move the cursor with the arrow keys in editing mode. Press [NEXT] to return to the previous menu or cancel the setting before you press [ENTER].

The real-time clock can also be set in run mode through a maneuverable clock object and during the transfer of projects from a PC to the terminal.

A digital signal set by a command can let operators know when it is time to change the battery for the real-time clock.

Information page

The terminal contains an information page. The information page is activated by pressing the key combination [←] and [PREV] simultaneously in RUN mode. A function or touch key can also be used or configured to call up the information page.

The current terminal, system program version and hardware version are shown at the top of the information page.

Parameter	Description
STARTS	Number of times the terminal has been started
RUN	Number of hours the terminal has been running
CFL	Number of hours the backlighting has been switched on.
32°C MIN: 21 MAX: 38 (example)	Current operating temperature, lowest and highest temperature measurement
DYNAMIC MEMORY	Available RAM memory (working memory) in number of bytes.
FLASH MEM PROJ	Available Flash memory (project memory) in number of bytes.
FLASH MEM BACK	Reserved
FLASH CACHEHITS	Percent of block / allocation cache hits in the file system.
FLASH ALLOCS	Maximum percent of used or active allocations per block in the file system.
DRIVER 1	Current driver and driver version.
DIGITAL I/Os	The number of digital signals linked to controller system 1 continuously monitored (STATIC) and the number in the current block (MONITOR).
ANALOG I/Os	The number of analog signals linked to controller system 1 continuously monitored (STATIC) and the number in the current block (MONITOR).
I/O POLL	The time in ms between two readings of the same signal in controller system 1.
PKTS	The number of signals in each package transferred between the terminal and controller system 1.
TOUT1	The number of timeouts in communication with controller system 1.
CSUM1	The number of checksum errors in communication with controller system 1.
BYER	The number of byte errors in the communication.
DRIVER 2	Current driver and driver version. The parameters for Driver 2 are only shown if controller system 2 is defined in the project.
DIGITAL I/Os	The number of digital signals linked to controller system 2 continuously monitored (STATIC) and the number in the current block (MONITOR).
ANALOG I/Os	The number of analog signals linked to controller system 2 continuously monitored (STATIC) and the number in the current block (MONITOR).
I/O POLL	The time in ms between two readings of the same signal in controller system 2.
PKTS	The number of signals in each package transferred between the terminal and controller system 2.
TOUT2	The number of timeouts in communication with controller system 2.
CSUM2	The number of checksum errors in communication with controller system 2.
1 / 2 / 3	Current port for FRAME, OVERRUN and PARITY. 1 = RS-422 port, 2 = RS-232 port and 3 = RS-485 port.
FRAME	The number of frame errors in each port.
OVERRUN	The number of overrun errors in each port.
PARITY	The number of parity errors in each port.

Joystick function

Applicable for DOP11A-20 and DOP11A-40 only.

This function makes it possible to use the arrow keys as function keys. Enter the command AK and an address in the command line under **system signals**. Example: AKM100 (command AK and memory cell M100).

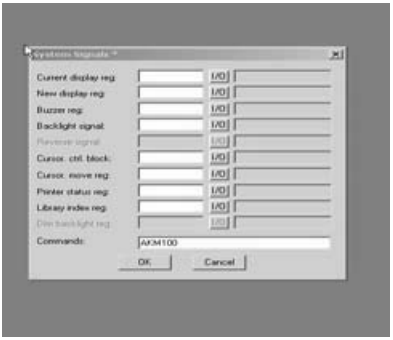


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Figure 23: System signals

Memory cell M100 is the enable signal and the following four memory cells have functions according to the following control block.

Memory cell	Description
Mn0	Active = Joystick function. Disabled = normal function.
Mn1	LEFT ARROW
Mn2	DOWN ARROW
Mn3	UP ARROW
Mn4	RIGHT ARROW

If you press on an arrow when the enable signal is on, the memory cell corresponding to the key you press will be set to one. When the enable signal is set to one the arrow keys will not have their normal functions.

Example

Use the following example to toggle between joystick function and normal function.

Perform the following steps:

- Use the DEMO driver
- Enter the following text under "system signals/commands": "AKM1."
- Generate a text block.
- Enter the static text "JOYSTICK."
- Create a digital object with the following settings:
  - Digital signal: M1
  - Text 0 : OFF
  - Text 1 : ON
  - Activate input: YES
- Create four additional digital objects to observe the memory contents of M2, M3, M4 and M5.

Display of text block according to sample settings:

JOYSTICK # - - -

M2 #

M3 #

M4 #

M5 #

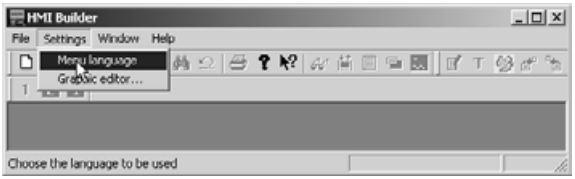
6 Operation and Service

6.1 Project transfer with PC and HMI-Builder

You need the HMI-Builder software for starting up the terminal with your PC.

1. Start the HMI-Builder program.

2. Select the language in the "Settings/Menu language" selection field.



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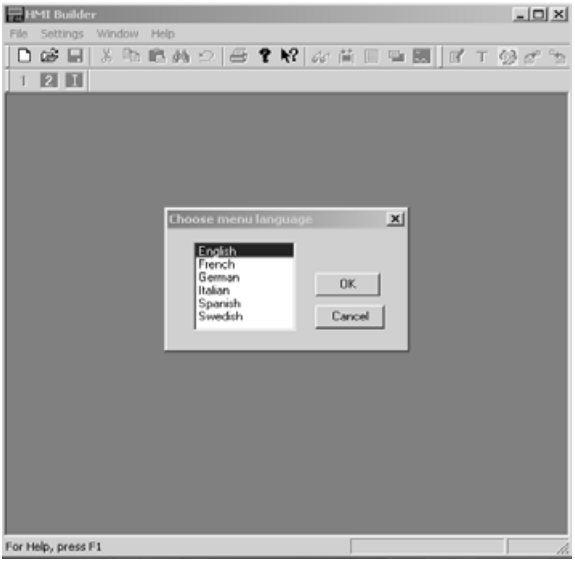

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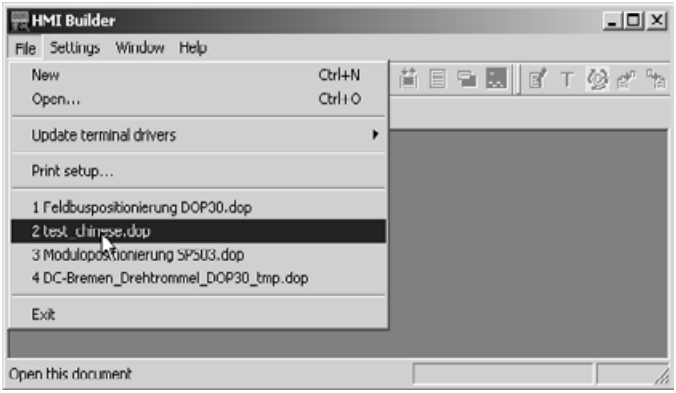
3. Use the "File/Open" function to open the project file you would like to transfer to the terminal.



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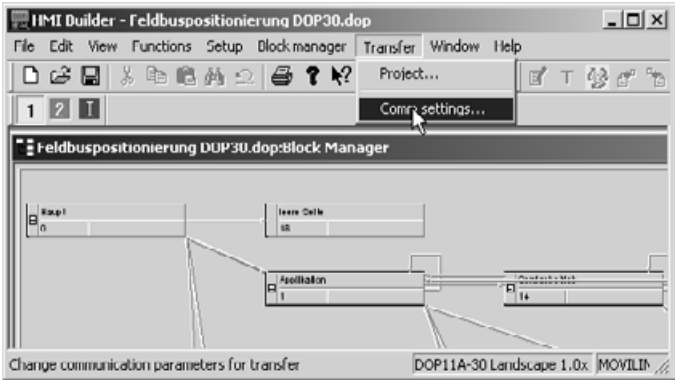
4. In the selection field "Transfer/Comm settings" select the communication connection **Use serial transfer** and enter the necessary parameters:


HMI Builder - Feldbuspositionierung DOP30.dop
File Edit View Functions Setup Block manager Transfer Window Help
Project...
Comm settings...
Feldbuspositionierung DOP30.dop:Block Manager
Change communication parameters for transfer
DOP11A-30 Landscape 1.0x

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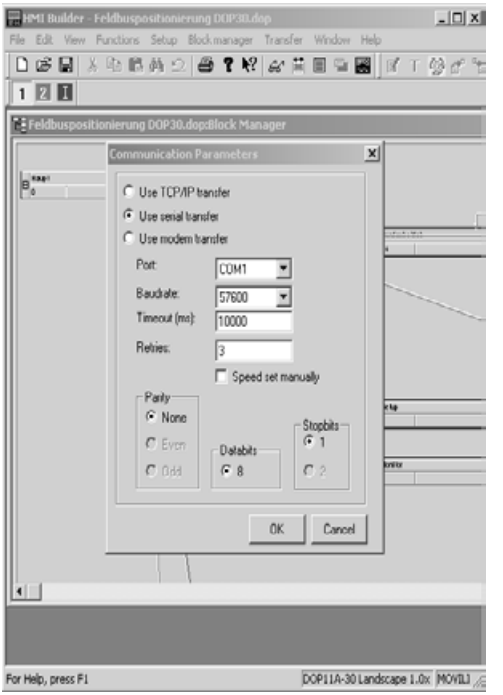
Serial transfer when using the PCS11A programming cable.

Enter following information:

- Communication port of the PC (e.g. Com1)
- Baudrate (default 57,600)
- Timeout period (free entry, default 10,000 ms)
- Number of retries in case of communication problems (default 3)

If a project is transferred to the terminal for the first time, the transfer will take place via serial connection and the PCS11A programming cable.



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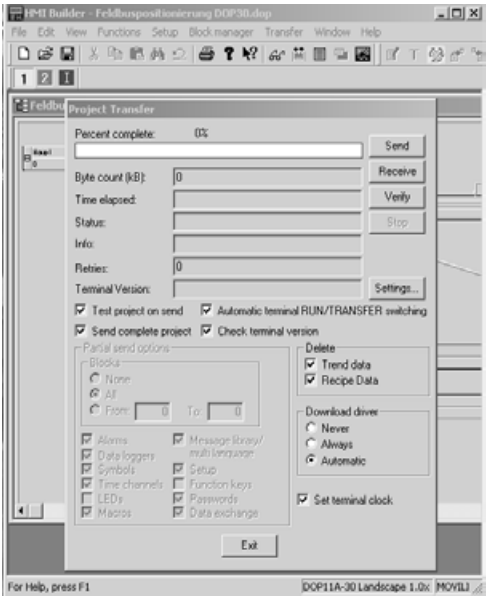
5. The project can now be transferred to the terminal with the selection field "Transfer/Project".

   The following functions are active as standard and must remain in this setting.

   - Test project on send
   - Send complete project
   - Automatic terminal RUN/TRANSFER switching
   - Check terminal version

   Download of files takes place after activation of **Send** button.



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The following steps will be executed one after the other:

- Switching the terminal to transfer mode (TRANSFER)
- Transfer of download driver for inverter and PLC
- Transfer of project data
- Switching the terminal to RUN mode

The individual steps will be displayed during transfer in the terminal display.

After conclusion of transfer, exit the dialog window with the **Exit** button and close the HMI-Builder.

6.2 Creating a project

Basics

This chapter describes the system structure of the terminal and its basic functions. There is also an explanation of the general principles, object parameters and joint functions applicable in the terminal.

Method for programming a project

The graphical structure of the application in the terminal constitutes a well-arranged monitoring tool for the operator. It is important to organize the application well and to consider which functions are necessary. Start with the overall view, and then work down to the detailed level. When a project is programmed you start with the functions in your application. Each function becomes one or more blocks, depending on the complexity of the function. A project can contain both graphic and text blocks, and each block can contain static and dynamic objects. The blocks should be arranged in hierarchies to achieve a structured application, and to simplify work procedures for the machine operator. The application can also be organized as sequence controls.

The application can be tested in full or in part prior to startup.

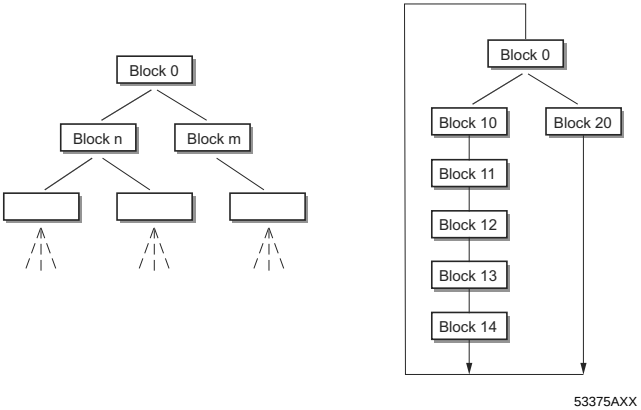


Figure 24: Block structure

Effective communication

Read the following notes on signal transmission and their optimization for fast and effective communication between terminal and controller.

Signals that influence the communication time

Only signals for objects in the current block will be read continuously. These include dynamic object signals. Signals for objects in other blocks will not be read. The number of blocks does not affect the communication time.

In addition to signals for objects in the current block, the terminal continuously receives the following signals from the controller:

- Display signals (block header)
- Block print signals (block header)
- LED register
- Alarm signals
- External confirmation signals for alarms and alarm groups
- Login signal (password)
- Logout signal (password)
- Trend curve register
- Register for column objects when min. / max. indicators were used
- New display register
- Buzzer register
- Backlight signal
- Cursor control block
- Recipe control block
- Library index register
- Index register
- Register for PLC clock if it was used in terminal
- List erase signal (alarm settings)
- No protocol mode control register
- No protocol signal

Signals that do not influence the communication time

The following signals do not affect the communication time:

- Signals for function keys
- Time channels
- Objects in alarm texts

Optimize communication

Grouping controller signals

The signals from the controller (see list in previous paragraph) will be read the fastest if they are bundled in one group, such as: If you have defined 100 signals you will reach the highest reading speed by grouping them (e.g. H0-H99). If the signal transfer takes place in individual steps (e.g. P104, H17, H45, etc.), then the update will take much longer.

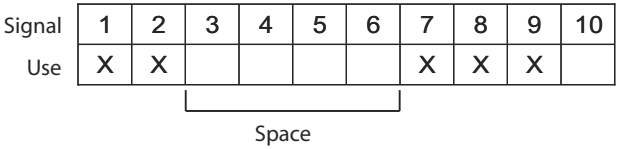
Effective block change

You will reach an optimum block change by using the block jump function of the function keys or via the jump object. The display signal in the block header may only be used if the controller is to enforce the opening of another block. If the controller is to change the display, you can use the new display register. This option affects the communication less then a larger number of display signals.

Signal packages

Transfer of signals between terminal and controller does not take place for all data at the same time. The information is separated into packages that contain several signals each. The number of signals in each package depends on the selected driver.

A minimization of the number of packages is necessary to have the communication take place as quick as possible. Grouped signals require merely a minimum number of packages. Such programming is not possible in all cases. There may be spaces in between two signals in such cases. A space represents the maximum distance between two signals that are part of the same package. The size of the space depends on the selected driver.



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User interface

Use graphic blocks for the user interface

Text blocks are mainly for printout of reports. They are slower and require more memory than graphic blocks.

Use 3D effects for an appealing user interface

You can accomplish a visually impressive design by combining objects with frame and 3D rectangles. Such a design emulates a light incidence from top left. Such an angle creates shadow effects at the lower and right side of raised objects as well as on the upper and left side of lowered objects.

Menu structure

The terminal is divided into two modes: **configuration mode and run mode**. In each respective mode there are a number of different levels, depending on the function. Each level consists of a menu where you make a selection or enter parameters before going to the next level (menu).

The application is built up of **blocks, graphic blocks** and/or **text blocks** (primarily for report printouts). Values from the controller system are shown and changed in the blocks. Each block has a number between 0 and 989 allocated by the programmer. The blocks 990 999 are reserved for special purposes, so-called **system blocks**. The terminal is object oriented, which means that a block can contain all the signals linked to an object for the control and monitoring of, for example, a pump.

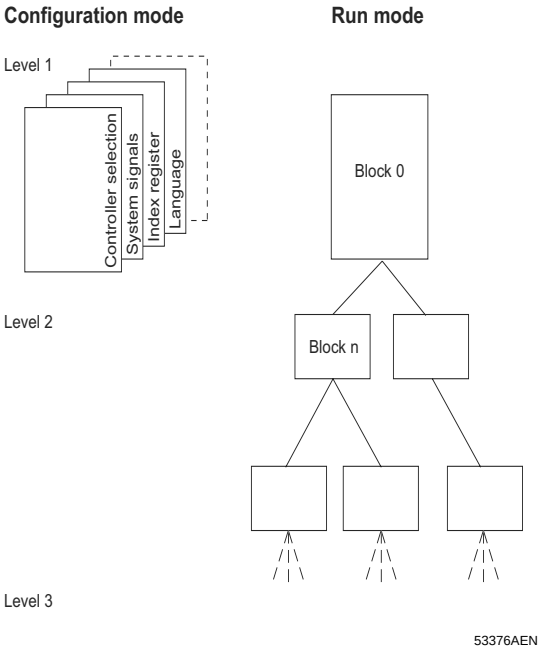

Figure 25: Configuration mode and run mode

Blocks

A block header is defined for each block. The header contains the block number, block type, status word, etc. The functions Alarms, Time channels, System monitor, E-mail and Contrast settings can also be invoked as blocks. These are designated system blocks.

150 blocks are permitted for the DOP11A-10. In the other terminals a maximum of 990 blocks can be defined.

The block type cannot be changed for a defined block.

Signal formats

The following signal formats are available in the dialog for each object, on the assumption that the selected driver supports the signal format.

Format type	Area
Signed 16-bit	-32768 – +32767
Unsigned 16-bit	0 – +65535
Signed 32-bit	-2147483648 – +2147483647
Unsigned 32-bit	0 – +4294967295
Float with exponent, 32-bit	±3.4E38, numbers larger than 1,000,000 are shown with exponent (now with MOVILINK driver).
Float without exponent, 32-bit	Parameter Positions (including decimal point and characters) and Decimals indicate the available area. As a result, 8 positions and 3 decimals result in ±999.999 (not with MOVILINK driver).
BCD Float	0 – 9999.9999 (not with MOVILINK driver)
BCD 16-bit	0 – 9999 (not with MOVILINK driver)
BCD 32-bit	0 – 99999999 (not with MOVILINK driver)
HEX 16-bit	0 – FFFF
HEX 32-bit	0 – FFFF FFFF
Seconds 16-bit	The object Analog numeric can be displayed in the time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK driver).
Seconds 32-bit	The object Analog numeric can be displayed in the time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK driver).
String	Character string which can be used in the dynamic function for graphic objects in DOP11A-20 to DOP11A-50. Example: In the object Static symbol, Digital symbol and Multisymbol, the dynamic property Symbol can be linked to a register with the format String.
Array 16-bit	Table format which can be used for an Event in the dynamic function for graphic objects in DOP11A-20 to DOP11A-50. Example: A group of registers is to be allocated different values when Value entered is equal to 99. The first value in the field Value will then be entered to register D21 in the field Signal. If the field Value appears as follows <1,2,3,4> the value 2 will be entered in the next subsequent register (D22), etc.

Installation HMI-Builder

Programming software

The HMI-Builder is a programming software used to develop projects for operator terminals of the DOP11A series. The functions in the HMI-Builder depend on the selected terminal.

We recommend using a mouse as the input device for the programming software. Refer to the Windows Users Guide for information on key combinations.

A project is created with graphic blocks and text blocks in the programming software, which are then transferred to the operator terminal. You will find a description of the programming steps in the DOP11A operator terminal system manual.

Help texts are available for all functions. The help text for the current function is obtained by pressing the F1 key. By pressing the help button in the toolbox and then clicking on a function, information is shown on the function.

System requirements

HMI-Builder needs a PC with at least 55 MB of available memory and the Microsoft Windows 95/98/NT/2000/XP operating system. The programming software can be used on either a color or monochrome screen.

Installation of HMI-Builder

The programming software is supplied on a CD. When you place the CD in your CD ROM drive the installation will start automatically. If not, select **RUN** in the **Start menu** and the enter D:/setup.exe command (if D: is the CD ROM drive). Select to install the programming software by clicking on the name and following the instructions.

The installation wizard creates an icon for the programming software in the program group of the programming software. To start the programming software, click on **Start** and select **Programs/Drive Operator Panels DOP/ HMI-Builder**. The manual can be read directly from the CD by clicking on **Manuals**.

Menu

From the menu bar you can reach a number of pull-down menus: **File, Edit, View, Functions, Setup, Object, Layout, Block Manager, Transfer, Window and Help.**

Menu	Description
File	Contains functions that effect the entire project.
Edit	Here you will find the functions **Cut**, **Copy** and **Paste**.
View	**Block manager**, **Alarm manager** and **Symbol manager** are available in this menu item.
Functions	This menu configures the function keys, LEDs, passwords and macros. You can also enter alarm texts and alarm groups.
Setup	Here you will set the basic configuration for the terminal.
Object	Is available in the managers only and holds all objects. The objects are also included in the toolbox.
Layout	Is available in graphic block manager only and includes functions for positioning of objects in graphic blocks.
Block manager	Settings for visual representation of block manager
Transfer	The functions in the Transfer menu are used to transfer projects between the programming software and the terminal.
Window	Contains all general Windows functions. You can also make grid settings and define the search path to external programs, such as Paintbrush.
Help	Contains the help functions for the program

Status bar

The status bar is located at the bottom of the HMI-Builder program window. In the **View** menu there is a function to show / hide the status bar.

The left part of the status bar describes the menu function selected in the menu. A short description of the function the cursor points to is shown for the functions in the toolbox.

The right part of the status bar indicates which of the following keys are activated:

OVR Overwrite (Insert key)

CAP Caps Lock

NUM Num Lock

Coordinates, line and column, in the block manager are also shown.

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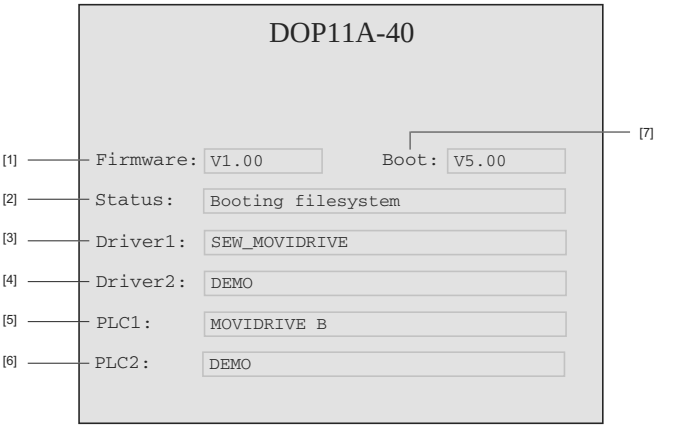
Figure 26: Status bar

6.3 Operating display at unit start



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[1] Firmware version of the operator terminal

[2] Status of the boot process
E.g.:
PROJECT STATUS
TCP/IP ADDRESS
CHECKING PLC 1
CHECKING PLC 2
...

[3] Communication driver loaded in Controller 1
e.g.:
DEMO
SEW_MOVIDRIVE
...

[4] Communication driver loaded in Controller 2
e.g.:
DEMO
SEW_MOVIDRIVE
...

[5] Communication status of Controller 1
e.g.:
NO CONNECTION
DEMO
MOVITRAC 07
MOVIDRIVE A
MOVIDRIVE B
...

[6] Communication status of Controller 2
e.g.:
NO CONNECTION
DEMO
MOVITRAC 07
MOVIDRIVE A
MOVIDRIVE B
...

[7] Version of operator terminal boot routine

6.4 Error messages

Errors in RUN mode will be displayed in the upper left hand corner of the display as error message.

They are divided into two groups:

- Boot error (no inverter connected)
- Operation errors - Comm Errors (error list)

Boot error (no inverter connected)

Boot error: **1: Comm Error 254** means: no communication with connected inverters.

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[1] Controller where the communication error occurs.
e.g 1 or 2

[2] Error type
e.g. operation error - Comm Error

[3] With RS-485 address:
e.g.:
01 - 99
254 (= Point to Point!)

Operation errors - Comm Errors (error list)

Message from operator terminal	Error code	Description
no error	00 00	No error
invalid parameter	00 10	Illegal parameter index
fct. not implement	00 11	Function / parameter not implemented; • Controller does not know parameter addressed by the operator terminal. Check correct selection of MOVILINK driver. Individual parameters of the MOVITRAC® 07, MOVIDRIVE® A and MOVIDRIVE® B controllers are slightly different. • Another reason for this error may be the controller firmware. Recently added parameters may not be included in older versions of the unit firmware.
read only access	00 12	Read access only • No write access to addressed parameter. Deactivate "Activate input" function in project of operator terminal.
param. lock active	00 13	Parameter lock is active • The "Parameter block" function was activated via parameter P803 in the addressed controller. Set parameter P803 to "OFF" by using the controller keypad or the PC software MOVITOOLS® to deactivate the parameter lock.
fact. set active	00 14	Factory setting is active • Controller is performing a factory setting. Parameter change option is locked for a few seconds. Communication will be automatically reactivated once factory setting is complete.
value too large	00 15	Value too large for parameter • Operator terminal is trying to write a value to a parameter that is not within the permitted value range. Adapt the project of the operator terminal in the "Access" area to be within the limits of the minimum and maximum input values. You will find the respective limit values in the parameter list of the controller.
value too small	00 16	Value too small for parameter • Operator terminal is trying to write a value to a parameter that is not within the permitted value range. Adapt the project of the operator terminal in the "Access" area to be within the limits of the minimum and maximum input values. You will find the respective limit values in the parameter list of the controller.
option missing	00 17	Required option card missing for this function / this parameter.
system error	00 18	Error in system software of controller • Contact SEW service.
no RS485 access	00 19	Parameter access via RS-485 process interface on X13 only
no RS485 access	00 1A	Parameter access via RS-485 diagnostic interface only
access protected	00 1B	Parameter is access-protected • No read or write access to this parameter; parameter not suitable for use in operator terminal.
inhibit required	00 1C	Controller inhibit required • The addressed parameter can only be altered with inhibited controller. Activate the controller inhibit status by removing the terminal X13.0 or via fieldbus (control word 1/2 basic block = 01hex).
incorrect value	00 1D	Incorrect value • Some parameters can only be programmed to certain values. You will find the respective limit values in the parameter list of the controller.
fact. set active	00 1E	Factory setting was activated
not saved in EEPRO	00 1F	Parameter was not saved in EEPROM • Power-failure save failed.
inhibit required	00 20	Parameter cannot be changed with enabled output stage • The addressed parameter can only be altered with inhibited inverter. Activate the controller inhibit status by removing the terminal X13.0 or via fieldbus (control word 1/2 basic block = 01hex).

6.5 SEW Electronics Service

Sending in for repair

Please contact the SEW electronics service if an error cannot be rectified (→ "Customer and spare parts service").

When contacting the SEW electronics service, always quote the digits of the unit designation so that our service personnel can assist you more effectively.

Please provide the following information if you are sending the unit in for repair:

- Serial number (→ nameplate)
- Unit designation
- Brief description of the application
- Nature of the error
- Accompanying circumstances
- Your own presumption of what has happened
- Any unusual events preceding the problem, etc.

7 Technical Data and Dimension Drawings

7.1 General technical data

Display

	DOP11A-10	DOP11A-20	DOP11A-30	DOP11A-40	DOP11A-50
Graphics resolution (pixels)	No graphics	240 x 64	320 x 240	320 x 240	640 x 480
Line x line text	2 x 20	Graphic			
Active screen size, W x H	73.5 x 11.5 mm	127.2 x 33.9 mm	115.2 x 86.4 mm	115.2 x 86.4 mm	211.2 x 158.4 mm
Background lighting	50,000h at an ambient temperature of +25 °C. LED.		50,000h at an ambient temperature of +25 °C. Touch Screen. CFL.	50,000h at an ambient temperature of +25 °C. CFL.	50,000h at an ambient temperature of +25 °C. Touch Screen.
Contrast setting	Via slide rule; Position: upper right hand corner on terminal back.	Via system block			
Screen	LCD screen (liquid crystal), monochrome, 2 lines with 20 characters each, 5 mm character size	LCD screen (liquid crystal), 240 x 64 pixels, monochrome, 4 lines with 20 characters each or 8 lines with 40 characters each.	LCD screen (liquid crystal), 320 x 240 pixels, 256 colors (graphics and text)	LCD screen (liquid crystal), 320 x 240 pixels, 256 colors (graphics and text)	TFT screen, 640 x 480 pixels, 256 colors (graphics and text)

Technical data

	DOP11A-10	DOP11A-20	DOP11A-30	DOP11A-40	DOP11A-50
Keyboard	• Numeric key-pad • Navigation key-pad • Three function keys • No LEDs	• Numeric key-pad • Navigation key-pad • Eight function keys • 16 LEDs (red / green)	Touch resistive	• Numeric key-pad • Navigation key-pad • 16 function keys • 16 LEDs (red / green)	Touch resistive
Keyboard material / Material for unit face	Membrane keypad with polyester caps Overlay autotex F207 with back print 1 million operations	Membrane keypad with polyester caps Overlay autotex F207 with back print 1 million operations	Touch screen Polyester on glass 1 million operations	Membrane keypad with polyester caps Overlay autotex F207 with back print 1 million operations	Touch screen Polyester on glass 1 million operations
Graphical objects	No	Yes			
Real-time clock	±10 PPM + error display through ambient temperature and supply voltage. Max. total error display: 1 minute/month = 12 minutes/year. The real-time clock battery has a rating life of ten years.				
Supply voltage	DC 24 V (DC 20-30 V), 3-pole terminal contact CE				AC 100-240 V, 3-pole terminal contact CE
	The voltage supply has to meet requirements for SELV according to IEC 950 or IEC 742. UL: Supply voltage according to guidelines for voltage supply class 2.				
Current consumption at operating voltage	Max. 200 mA	Without load: 300 mA Max. load: 450 mA	Max. 400 mA	Without load: 300 mA Max. load with expansion card: 550 mA	Max. 0.17 - 0.35A (AC 240 - 100 V)
Ambient temperature	+0 to +50 °C				
Storage temperature	-20 to +70 °C				
Relative humidity	Max. 85 % (non-condensed)				
Dimensions W x H x D	142 x 90 x 3.5 mm	214 x 194 x 6 mm	200 x 150 x 5 mm	276 x 198 x 5.7 mm	290 x 247 x 6 mm
Installation depth	29 mm without D-sub contact and 96.5 mm with D-sub contact	69 mm without D-sub contact and 110 mm with D-sub contact	70 mm without D-sub contact and 70 mm with D-sub contact	87 mm without D-sub contact and 110 mm with D-sub contact	109 mm without D-sub contact and 130mm with D-sub contact
Enclosure front	IP65, NEMA 4, NEMA 4X (indoor use only)				IP65, NEMA 4
Enclosure back	IP20				
Protection material back	Galvalume	Yellow-chromatized sheet metal			
Weight	without D-sub contact: 0.5 kg	without D-sub contact: 1.5 kg	without D-sub contact: 1.5 kg	without D-sub contact: 1.7 kg	without D-sub contact: 3.3 kg
Memory	Flash memory: 64 kB for application	Flash memory: 400 kB for application			Flash memory: 1600 kB for application
EMC tests of terminal	The terminal conforms with the essential protection requirements in article 4 of the EMC directive 89/336/EEC. Tested according to: EN50081-1 (emission) and EN50082-2 (interference immunity).				
UL approval	UL 508, UL 1604 (class I div 2)				
DNV approval	Approval by Det Norske Veritas Typgodkännande in classes temperature A, relative humidity B, vibration A, protection cover C (front cover only).				
Expansion slots	None	1 expansion slot	1 expansion slot	2 expansion slots	2 expansion slots

Functionality

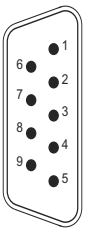
	DOP11A-10	DOP11A-20	DOP11A-30	DOP11A-40	DOP11A-50
Alarm handling	No	Yes			
Intervals per time channel	4				
Recipe handling	Yes				
Passthrough mode	Yes				
Dual protocol	Yes				
Web server	No	Yes, with Ethernet option			
Printer function	Yes				

Communication

	DOP11A-10	DOP11A-20	DOP11A-30	DOP11A-40	DOP11A-50
Serial interfaces	Separate interface for programming and inverter communication. • RS-232 • RS-485/ RS-422 Two interfaces can be used at the same time.	Separate interface for programming and inverter communication. • RS-232 • RS-422 Two interfaces can be used at the same time.	Separate interface for programming and inverter communication. • RS-232 • RS-422 • RS-485 Two interfaces can be used at the same time.	Separate interface for programming and inverter communication. • RS-232 • RS-422 Two interfaces can be used at the same time.	Separate interface for programming and inverter communication. • RS-232 • RS-422 Two interfaces can be used at the same time.
Fieldbus via option slot	No options	PROFIBUS DP or ETHERNET		• PROFIBUS DP and / or • ETHERNET	• PROFIBUS DP and / or • ETHERNET
Serial port RS-422	25-pin D-sub contact, installed socket with standard retaining screws 4-40 UNC.				
Serial port RS-232	9-pin D-sub contact, installed plug with standard retaining screws 4-40 UNC.				
Serial port RS-485	RS-422 and RS-485 are combined in 25-pin D-sub contact. Installed socket with standard retaining screws 4-40 UNC.		4-pin contact, installed plug		

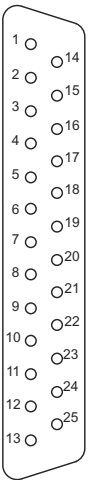
7.2 Pin assignment

RS-232

D-sub 9-pin contact, male	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	+5 V >200 mA [1]	←
	2	TxD	→
	3	RxD	←
	5	0 V	
	7	CTS	←
	8	RTS	→
	9		

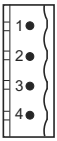
1) not connected

RS-485 For DOP11A-10 only:

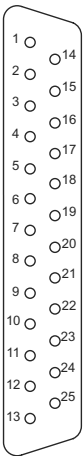
D-sub 25-pin socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	2	Tx/Rx+	↔
	15	Tx/Rx-	↔
	6	Tx/Rx -/ 120 Ω [1]	
	19	Tx/Rx+ [1]	
	7,8	0 V	

1) Jumper between 6 and 19 active 120 W terminating resistor of RS-485 bus.

For DOP11A-30 only:

D-sub 9-pin plug	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	Tx/Rx+	↔
	2	Tx/Rx-	↔
	3	0 V	
	4	⏚	

RS-422

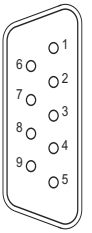
D-sub 25-pin socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	2	+TxD	→
	15	-TxD	
	3	+RxD	←
	16	-RxD	
	4	+RTS	→
	17	-RTS	
	5	+CTS	←
	18	-CTS	
	20	1)	
	21	1)	
	7,8	0 V	
	14	+5 V <50 mA	→
	12,13, 24,25	2) +5 V >200 mA	←
	9	3) TxD	→
	10	3) RxD	←
	22	3) CTS	←
	23	3) RTS	→

1) Terminal no. 20 connected internally to terminal no. 21

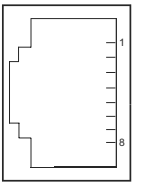
2) For DOP11A-10 only:

3) Rerserved

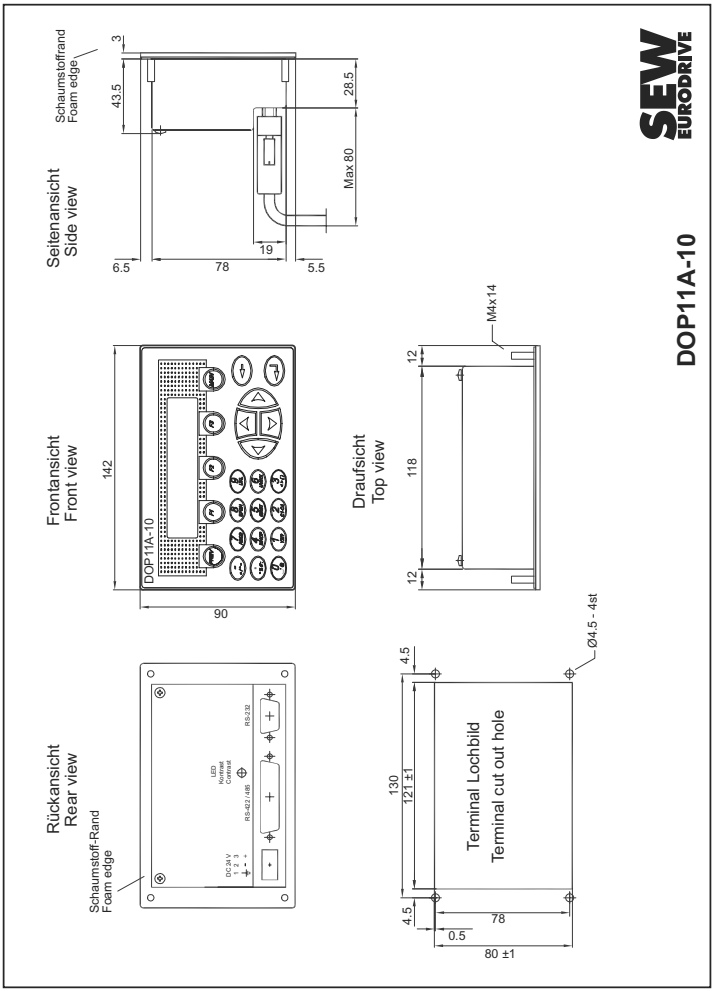
Profibus DP (option card)

D-sub 9-pin socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1		
	2		
	3	RxD/TxD-P	↔
	5	DGND	
	7		
	8	RxD/TxD-NS	↔
	9		

Ethernet 10BaseT (option card)

RJ45 socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	Tx+	→
	2	Tx-	→
	3	Rx+	←
	6	Rx-	←

7.3 DOP11A-10



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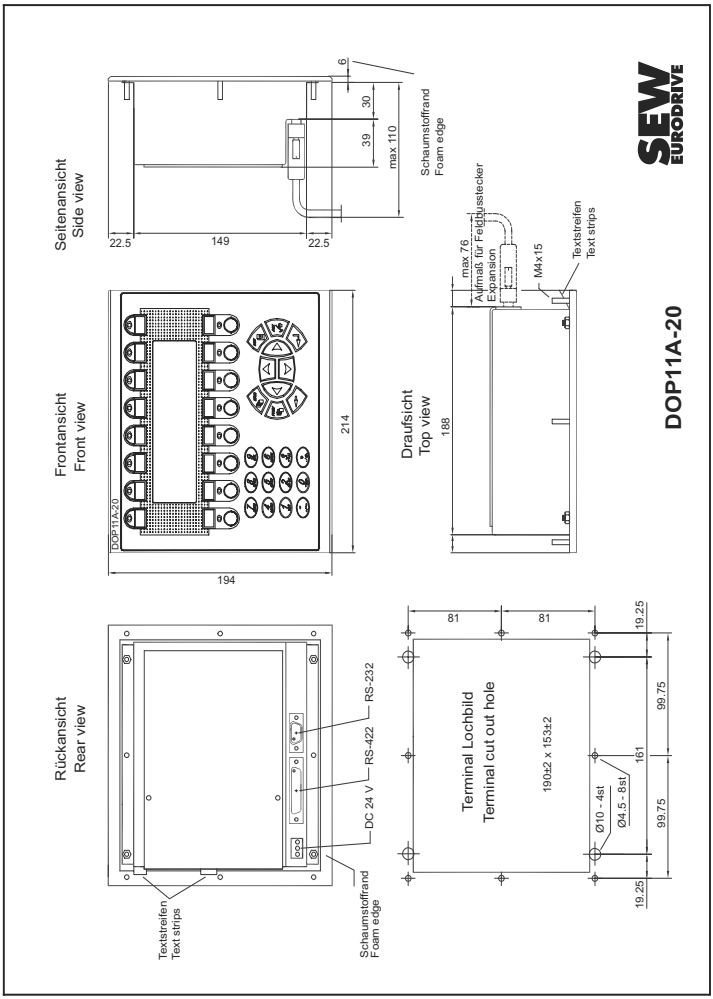
7.4 DOP11A-20



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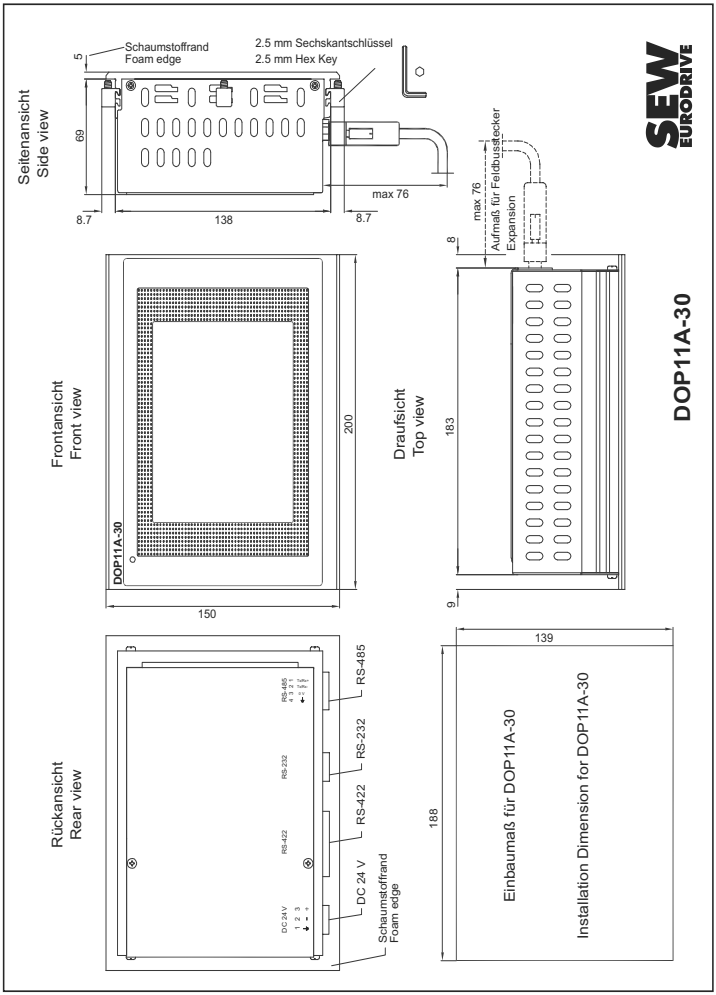

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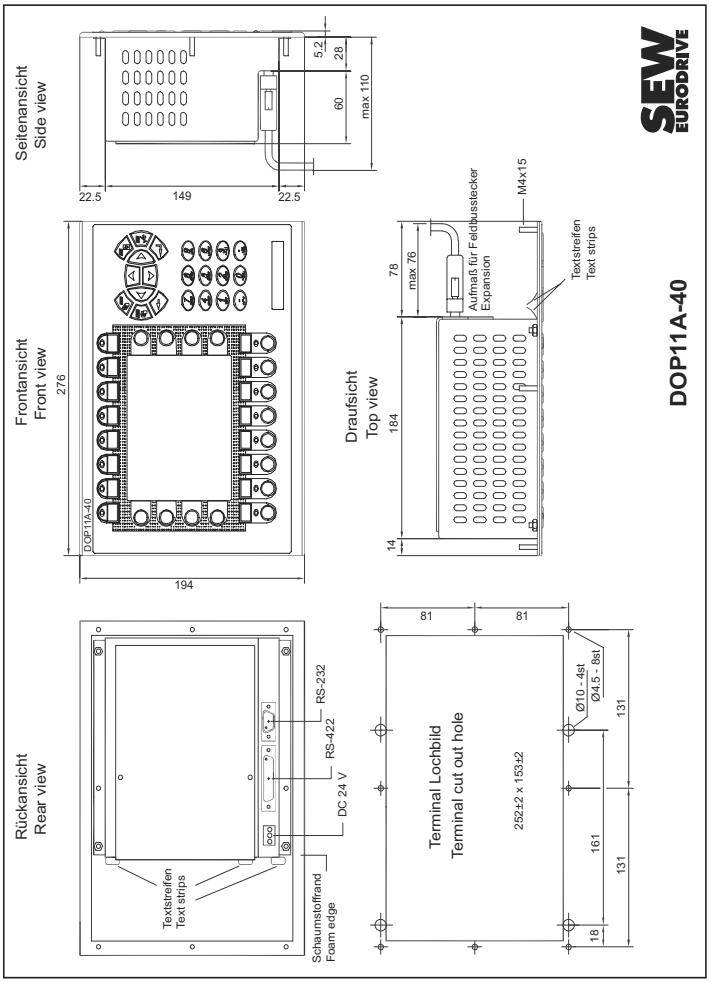

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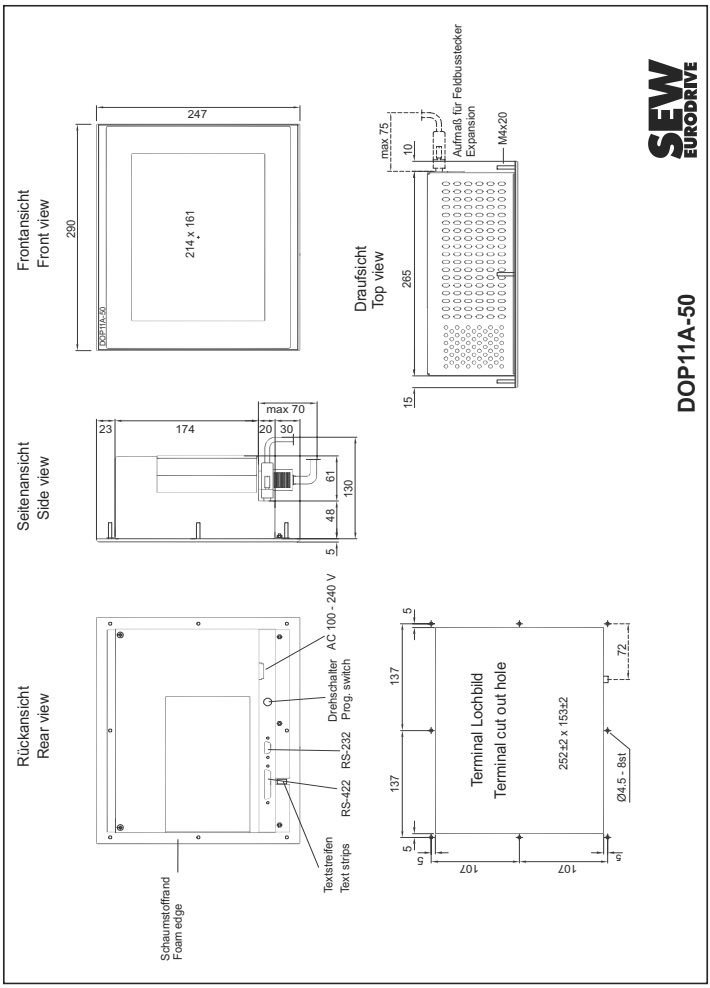

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8 Appendix

8.1 Membrane keypad

Autotex 2 resistance to solvents

Acceptable substances

The Autotex 2 material of the operator terminal can be exposed to the following substances according to DIN 42 115 part 2 for more than 24 hours without showing any noticeable changes.

- Ethanol
- Cyclohexanol
- Diacetone alcohol
- Glycol
- Isopropanol
- Glycerine
- Methanol
- Triacetin
- Dowanol DRM/PM
- Acetone
- Methyl ethyl ketone
- Dioxan
- Cyclohexanone
- Methylisobutylcetone
- Isophorone
- Ammonia <40 %
- Caustic soda <40 %
- Caustic potash <30 %
- Alkaline carbonate
- Bicarbonate
- Potassium ferricyanide
- Acetonitrile
- Sodium bisulphate
- 1.1.1 Trichloroethane
- Ethyl acetate
- Diethyl ether
- n-butyl acetate
- Amyl acetate
- Ethylen glycol monobutyl ether
- Ether
- Sodium hypochloride <20 %
- Hydrogen peroxide <25 %
- Potassium carbonate
- Gasolin
- Formaldehyde 37 % - 42 %
- Ethanal
- Aliphatics
- Toluene
- Xylene
- Mineral spirit
- Formic acid <50 %
- Acetic acid <50 %
- Phosphoric acid <30 %
- Hydrochloric acid <36 %
- Nitric acid <10 %
- Trichloracetic acid <50 %
- Sulfuric acid <10 %
- Cutting oil
- Diesel oil
- Linseed oil
- Parrafin oil
- Blown castor oil
- Silicone oil
- White spirit
- Universal brake oil
- Decon
- Aviation gasoline
- Laundry detergent
- Fabric softener
- Ferrous (III) chloride
- Ferrous (II) chloride
- Dibutyl phthalate
- Diethyl phthalate
- Soda
- Fresh water
- Salt water
- Teepol

Autotex did not show any signs after being exposed to pure acetic acid for less than one hour according to DIN 42 115 part 2.

Harmful substances

The operator terminal may not get in contact with the following substances.

- Strong mineral acids
- Strong caustic solutions
- High pressure vapor with a temperature of more than 100 °C
- Benzyl alcohol
- Dichloromethane

Substances that may change colors

Autotex will not change colors when being exposed to the following substances for 24 hours at a temperature of 50 °C:

- Top Job
- Ajax
- Persil (laundry detergent)
- Coffee
- Fantastic
- Formula 409
- Grape juice
- Jet Dry
- Vim (cleansing agent)
- Wisk
- Lenor
- Downey
- Ariel (laundry detergent)
- Milk
- Gumption
- Domestos
- Vortex
- Windex

Substances that may change colors

Closer examination showed slight discolorations due to contact with the following substances:

- Tomato juice
- Ketchup
- Lemon juice
- Mustard

A

Accessories ... 19
Alphanumeric keys ... 34
Application environment ... 5
Arrow keys ... 35

B

Boot error ... 55

C

Cable specification Ethernet ... 28
Cable specification PROFIBUS ... 30
Cable specification RS-485 ... 26
Configuration mode (SETUP) ... 38
Connection basic unit ... 22
Connection PFE11A Ethernet option ... 28
Connection PFP11A PROFIBUS DP option ... 29
Connection RS-422 ... 27
Connection RS-485 ... 24
Connection Siemens S7 via MPI & PCM11A ... 30
Connection to a PC ... 23
Connection to SEW frequency inverter ... 10
Connection UWS11A ... 27
Contrast setting ... 38
Control ... 11

D

Dimension sheet DOP11A-10 ... 64
Dimension sheet DOP11A-20 ... 65
Dimension sheet DOP11A-30 ... 66
Dimension sheet DOP11A-40 ... 67
Dimension sheet DOP11A-50 ... 68
Display ... 58
Disposal ... 5
DOP11A-10 ... 14
DOP11A-20 ... 15
DOP11A-30 ... 16
DOP11A-40 ... 17
DOP11A-50 ... 18

E

Error list ... 56
Error messages ... 55

F

Frequency inverter, connection ... 10
Function keys, integrated ... 35
Functions, terminal ... 34

I

Initial operation ... 31
Installation ... 11, 21
Installation HMI-Builder ... 52
Introduction ... 8

J

Joystick function ... 41

K

Key combinations ... 35

M

Membrane keypad ... 69

N

Nameplate ... 13

O

Operating display at unit start ... 54
Operating modes (RUN and SETUP) ... 37
Operation errors ... 56
Options ... 19

P

Pin assignment ... 61
Programming ... 10
Project creation ... 47
Project transfer ... 43

R

Repair ... 57
Reserved characters ... 35
Resistance to solvents ... 69
Return codes ... 56
Run mode (RUN) ... 39

S

Safety functions ... 5
Safety notes ... 4, 6
Scope of delivery ... 13
Service ... 57
Setting the real-time clock ... 39
Setting up the operator terminal ... 11
Startup ... 31
Status display ... 11
Switches ... 37

T

Technical data ... 58
Terminal keyboard ... 34
Troubleshooting ... 55

U

UL compliant installation ... 22
Unit designation ... 13

V

Voltage supply ... 22

W

Warning instructions ... 4

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	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
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	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

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	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
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Czech Republic			
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USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 467-3792 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 sewventas@cantv.net sewfinanzas@cantv.net

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